

# GREATER MARA Nest Monitoring Report 2022



MARA  
RAPTOR  
PROJECT



KENYA BIRD OF PREY TRUST



THE  
PEREGRINE  
FUND



WAGENINGEN  
UNIVERSITY & RESEARCH

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# Introduction

## Bird of prey conservation in Kenya

Birds of prey (also known as raptors) include all vultures, eagles, hawks, buzzards, goshawks, sparrowhawks, harriers, falcons, kestrels, owls, the osprey and the secretarybird. Most of these species are predators and/or scavengers. Over 100 species of raptors have been recorded in Kenya. Many of them are residents or are regular migrants to the region.

Unfortunately, many of Kenya's raptor species are declining rapidly and without immediate conservation action will continue to disappear from across the country. Six of the eight vulture species found in Kenya are listed as either Endangered or Critically Endangered by the International Union for the Conservation of Nature. We expect many of Kenya's large eagles to be up listed to Endangered in the coming years. The primary drivers of raptor population decline in Kenya are habitat loss, poisoning/persecution, and poorly designed energy infrastructure.

## The Mara Raptor Project

The Mara Raptor Project was officially established in 2019 by the Kenya Bird of Prey Trust, The Peregrine Fund and Wageningen University and Research. The primary aim of the MRP is to monitor bird-of-prey populations within and around the protected area network of the greater Mara region. These data are made available to conservation decision makers in the region (local government, conservancy managers, etc.) with the aim of informing conservation decision making.



## The Kenya Bird of Prey Trust

The Kenya Bird of Prey Trust is a registered Kenyan not-for-profit organization founded on many years of experience of bird of prey (raptor) management and conservation in Kenya and around the world. Their mission is to secure healthy raptor populations in Kenya.



## The Peregrine Fund

The Peregrine Fund is a non-profit organization founded in 1970 that conserves threatened and endangered birds of prey worldwide. The Peregrine Fund's Africa program has spent decades studying and conserving birds of prey in Kenya, and elsewhere in Africa and they are a close partner of the Kenya Bird of Prey Trust.



## Wildlife Ecology and Conservation Group



The Wildlife Ecology and Conservation Group at Wageningen University and Research studies how humans influence wildlife. They are a close partner of both The Peregrine Fund and the Kenya Bird of Prey Trust and are very interested in using the raptors that the Mara Raptor Project is monitoring as a study population to research theoretical ecology and applied conservation science.

## What is nest monitoring?

Nest monitoring is the detection and systematic observation of raptor nests to monitor breeding outcomes. Successful breeding is critical for raptor populations to thrive. Nest monitoring is a long-term project. The more years of data the more informative the dataset.

## Why nest monitoring?

Through systematic nest monitoring we can:

1. **Guide conservation decision making.** Raptors are one of the most Endangered species groups in the greater Mara region and their conservation needs to be prioritized if we are to slow and reverse their population declines. One of the best ways to protect raptors is to protect their nests. We strive to work closely with conservation managers that are responsible for the protection of the Maasai Mara, and we share our datasets freely with them. Having these data available informs decision making and justifies conservation action.
2. **Monitor population trends** so we can hold conservation actions accountable.
3. **Inform conservation statuses** by providing information to organizations, such as the International Union for the Conservation of Nature (IUCN). The IUCN monitors and assigns global population statuses of species (Endangered, Critically Endangered etc.).
4. **Improve our understanding of basic population ecology.** Many of these raptors are poorly studied and the more we know about them the better we can protect them.



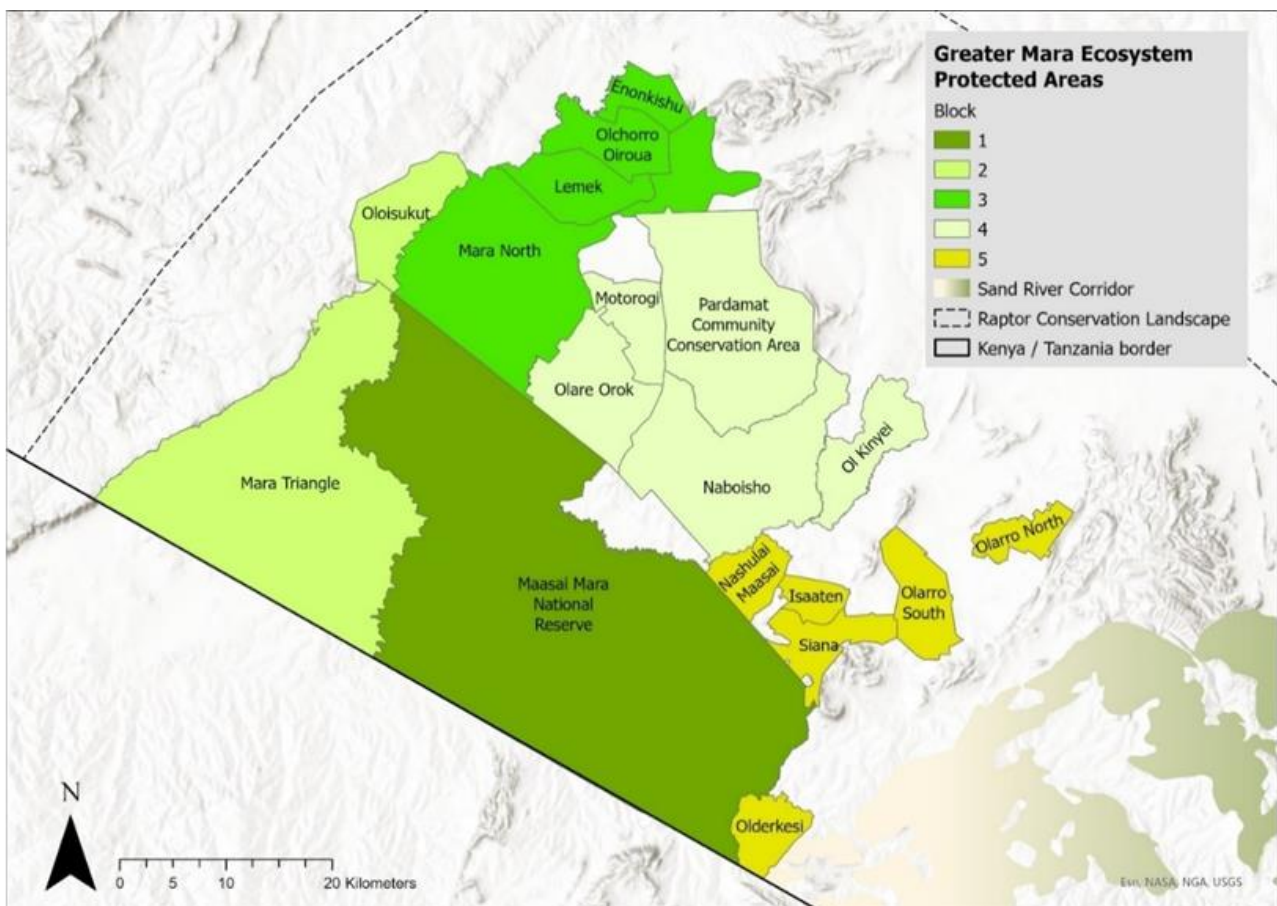
A Verreaux's Eagle Owl at its nest in the Naboisho Conservancy

## Where do we monitor nests?

The Mara Raptor Project monitors nests within the greater Mara region of southwestern Kenya. This ~3000km<sup>2</sup> area, that is often referred to as the Maasai Mara, includes the Maasai Mara National Reserve, The Mara Triangle, community owned wildlife conservancies and privately owned land. It forms the northern tip of the vast and world-famous Mara-Serengeti ecosystem.

The Maasai Mara is dominated by rich savannah grasslands that support high densities of wildlife. These grasslands are bordered and crossed by many other diverse habitat types including montane forest, riverine woodlands, acacia woodlands, acacia commiphora thickets, and small rocky cliffs. There is a distinct rainfall gradient within the Maasai Mara with increasing precipitation as you move from the northeast to the south and west. These diverse habitats hold remarkable biodiversity, including numerous raptor species and one of the largest populations of vultures in the world.

To effectively monitor this ecologically and politically diverse region we have divided the protected areas within the Maasai Mara into 5 nest monitoring blocks. These blocks are depicted in the map below and were selected based on political boundaries and nest-monitoring logistics. The Mara Raptor Project has hired or is planning to hire project coordinators that will be assigned a block and will be responsible for nest monitoring within their given area.



Protected areas within the Greater Mara and their allocated nest block.

## How do we monitor nests?

We focus our monitoring efforts in the Maasai Mara on 8 different large bird of prey species. These focal species are listed on the following page. These species were selected based on their conservation status (Critically Endangered etc.), their relevance as indicator species, and/or the global significance of the species' Mara population.

The first step of nest monitoring is nest detection. To find nests we carry out surveys in appropriate habitat. Nests are found either by locating a physical nest or by watching and observing raptor behaviour. The first time a nest is visited it is given an ID and a host of information is collected, including GPS location, habitat, nest tree species, cliff orientation, nest height etc. We call this first step of the nest monitoring process "Nest ID". *NB: Nests do not belong to a species as nests can be used by many species over multiple seasons. One of our nests has been used by three species.*

Once nests are found, we begin the process of monitoring. We call this next step of the nest monitoring process "Nest Check". We attempt to visit nests at least once every 3 months. When a nest appears active, we increase the frequency of visits to every 4-8 weeks depending on the species and the logistics of accessing the nest.

When nests are visited, we check their **status** by either watching the nest from a distance, walking around the nest to look for signs of use, or taking a photo of the nest contents using a camera attached to a telescopic pole. We take great care when checking nests to prevent unnecessary disturbance. We have crafted approaches for each species we monitor based on a species' general behaviour and/or known behavioural tendencies of individual birds. Every nest that has an egg laid is monitored through the breeding period until we can assign a nest **outcome** (e.g., success) and then the process repeats itself until a nest is destroyed.

To facilitate the collection of these data we have built two data collection applications using CyberTracker. These applications are entitled "Nest ID" and "Nest Check" and are described in detail in our "Nest Monitoring Protocol".

### **Status definitions**

Inactive: a nest where there is no breeding activity.

Nest-building: A nest that is being actively constructed.

Nest-lined: A nest that has been completely built and is ready for egg laying.

In-progress: A nest where either an egg or chick are present.

Fallen: a nest that has fallen but can be rebuilt.

Destroyed: a nest that has been destroyed and cannot be used/rebuilt (e.g., nest tree fell).

### **Outcome definitions**

Failure: a nest where an egg/s addled or when chick/s died.

Success: At least one chick successfully fledged.

Unknown: When we were uncertain whether a nest was a failure or a success.

## Focal species



Secretarybird  
*Sagittarius serpentarius*  
**Endangered**



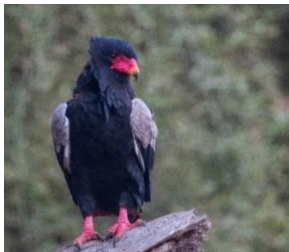
Lappet-faced Vulture  
*Torgos tracheliotos*  
**Endangered**



White-backed Vulture  
*Gyps africanus*  
**Critically Endangered**



White-headed Vulture  
*Trionoceph occipitalis*  
**Critically Endangered**



Bateleur  
*Terathopius ecaudatus*  
**Endangered**



Martial Eagle  
*Polemaetus bellicosus*  
**Endangered**



Tawny Eagle  
*Aquila rapax*  
**Vulnerable**



Wahlberg's Eagle  
*Hieraaetus wahlbergi*  
Least Concern

## Meet our nest monitoring team

**Lemein Par** is from Orkroi on the border of the Maasai Mara National Reserve. He has over 6 years of experience working with raptors in this ecosystem. He is the project manager for the MRP and leads our nest monitoring efforts.

**R. Stratton Hatfield** directs the MRP on behalf of the Kenya Bird of Prey Trust. He is also a PhD student at Wageningen University studying Martial Eagle ecology in the Maasai Mara.

**Britt Klaassen** is an ecologist and data scientist that manages the MRP's nest monitoring database. She conducted her master's research on cheetah habitat selection in the Maasai Mara ecosystem.

**Dr. Ralph Buij** is the Africa and Asia Conservation Director for The Peregrine Fund. He is also a research scientist at Wageningen University and Research and has over two decades of experience studying raptors around the world.



Lemein Par



R. Stratton Hatfield



Britt Klaassen



Dr. Ralph Buij

## 2022 summary

We monitored 269 nests in 2022, of which 156 were active and 113 were inactive. 153 of the monitored nests were used by our focal species, and 3 nests were used by non-focal species.

All the nests we systematically monitored in 2022 were located within the Maasai Mara National Reserve (Block 1).

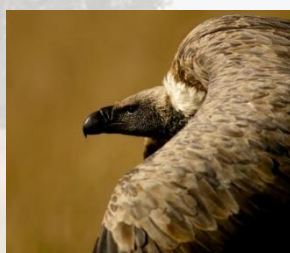
Below is an overview of the outcomes and statuses of the nests we monitored for each of our focal species in 2022.



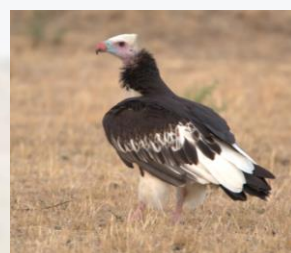
**Secretarybird**  
**1 nest**  
0 successes  
0 failures  
1 unknown  
0 in progress



**Lappet-faced Vulture**  
**38 nests**  
16 successes  
18 failures  
0 unknown  
4 in progress



**White-backed Vulture**  
**74 nests**  
26 successes  
28 failures  
20 unknown  
0 in progress



**White-headed Vulture**  
**3 nests**  
2 successes  
1 failure  
0 unknown  
0 in progress



**Bateleur**  
**9 nests**  
9 successes  
0 failures  
0 unknown  
0 in progress



**Martial Eagle**  
**3 nests**  
2 successes  
1 failure  
0 unknown  
0 in progress



**Tawny Eagle**  
**13 nests**  
7 successes  
3 failures  
1 unknown  
2 in progress



**Wahlberg's Eagle**  
**6 nests**  
0 successes  
1 failure  
0 unknown  
5 in progress

### **Outcome and status definitions**

Success: At least one chick successfully fledged a nest in 2022.

Failure: a nest where an egg/s addled or when chick/s died.

Unknown: When we were uncertain whether a nest was a failure or a success.

In-progress: A nest where either an egg or chick were still present at the end of 2022.



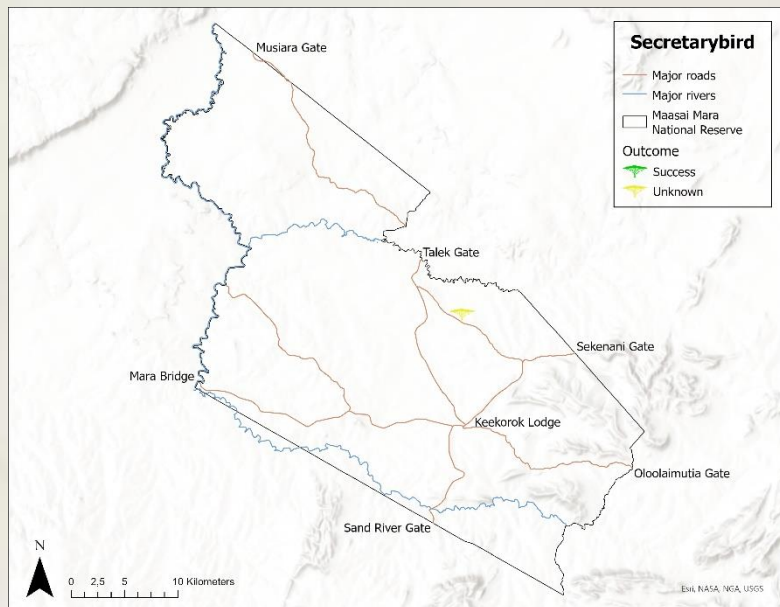
Secretarybird  
*Sagittarius serpentarius*

IUCN Status: **Endangered**

One of the most conspicuous and charismatic species in the Maasai Mara. They roam the grasslands preying on a wide variety of insects, rodents, and reptiles. Secretarybirds breed on average once a year. They build a stick nest in the top of a short, isolated tree and can produce as many as three chicks if conditions are good.

In 2022, we monitored only 1 active Secretarybird nest inside the MMNR. This nest, unfortunately, had an unknown outcome.

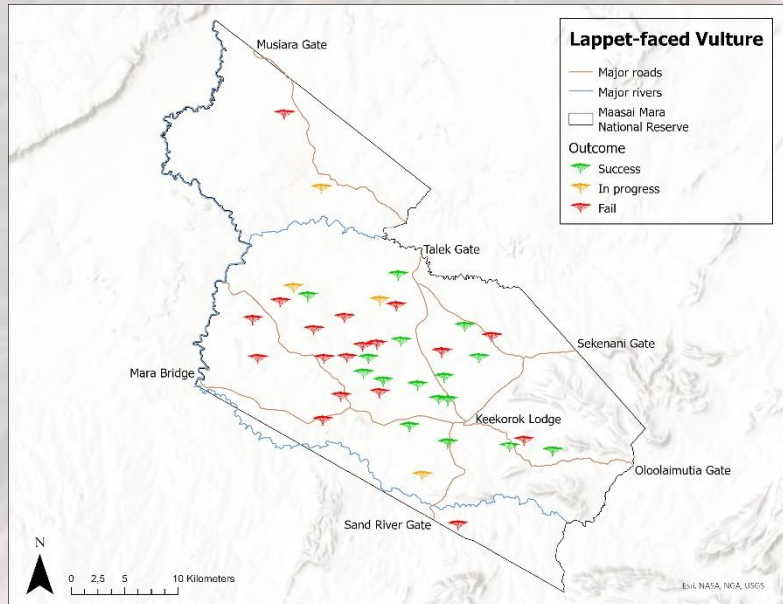
This nest was in open woodland in a *Gardenia* species that was 5.3 meters tall.



Lappet-faced Vulture  
*Torgos tracheliotos*

IUCN Status: **Endangered**

The largest vulture in the Mara and one that is easily identified by its bright pink head and massive bill. The Mara-Serengeti has one of the largest populations of this species. They breed on average once a year and nest in a short, isolated tree. They only produce one chick for every breeding attempt.



In 2022, we monitored 38 active Lappet-faced Vulture nests inside the MMNR. Of these 38 nests, 16 successfully fledged chicks. There were 18 nests that failed to fledge a chick, and 4 that were still in progress at the end of 2022.

Most of these nests were in open woodland (22 nests), some in isolated trees in open plains (15 nests) and 1 nest was in Whistling thorn. The most dominant tree species was a *Gardenia* species (13 nests), followed by *Olea Africana* (11 nests), *Boscia angustifolia* (8 nests), *Balanites aegyptiaca* (5 nests), and other (1 nest). The average nest height for Lappet-faced Vultures was 6.5 meters.



15 April 2022



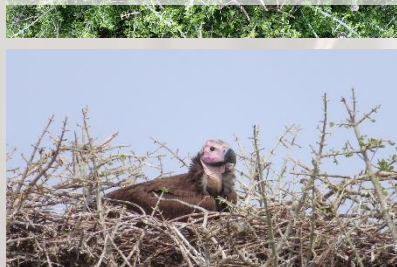
30 May 2022



15 June 2022



28 July 2022



14 September 2022

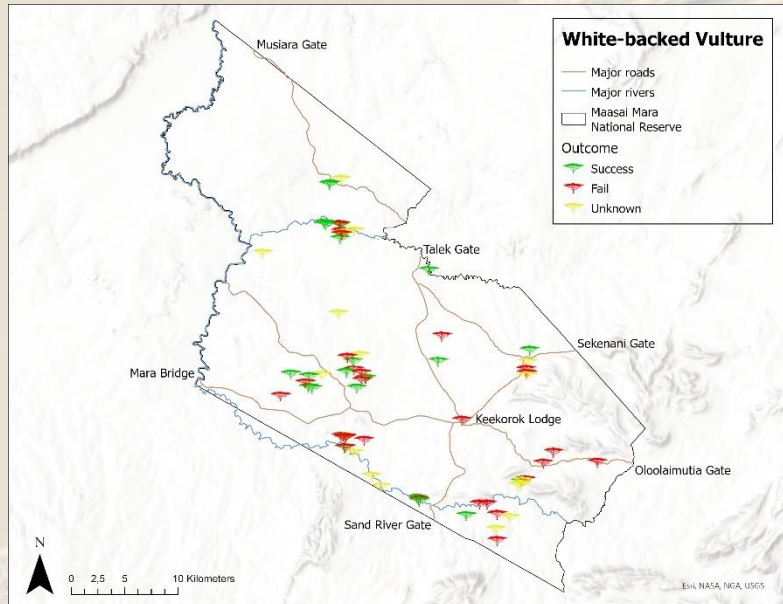


8 October 2022

White-backed Vulture  
*Gyps africanus*

IUCN Status: **Critically Endangered**

The most numerous vulture species in the Mara, but unfortunately one that is in precipitous population decline. This species, more than any, deserves the title of “cleanup crew” as they rapidly remove carcasses from the ecosystem. They breed on average once a year and only produce one chick for every breeding attempt.



In 2022, we monitored 74 active White-backed Vulture nests inside the MMNR. Of these 74 nests, 26 were successful with 26 chicks fledged. There were 28 nests that failed to fledge a chick, and 20 nests with an unknown outcome.

Most of the nests were in riverine woodland (55 nests), followed by open woodland (18 nests) and only 1 nest was in the open plains. The tree species that was used most often as a nest tree was a *Ficus* species. The average nest height was 12.0 meters.



8 April 2021



26 May 2021



19 July 2021

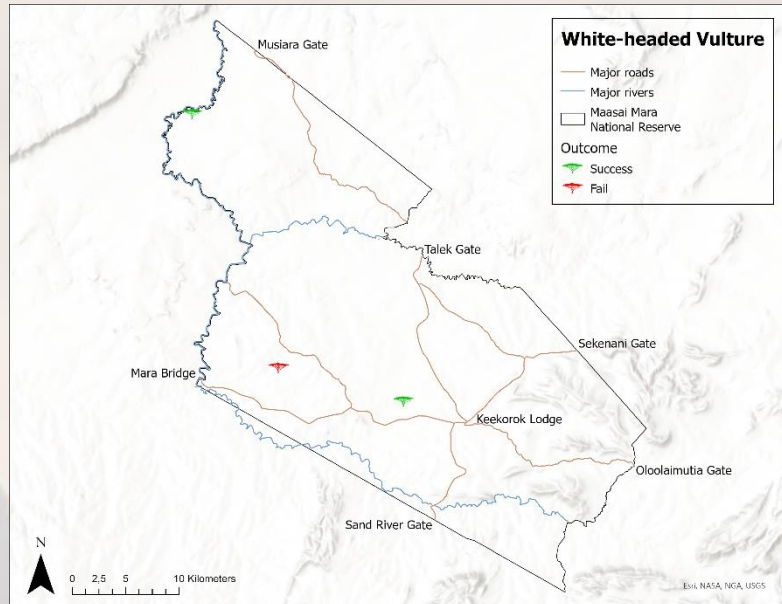


24 August 2021

White-headed Vulture  
*Trigonoceps occipitalis*

IUCN Status: **Critically Endangered**

The rarest regularly occurring vulture species in the Mara. We believe the entire population in the greater Mara ecosystem is now down to ~10 pairs. They are unique among vultures as they appear to have defended territories. They are a very sensitive species and readily abandon nests after disturbance. They breed on average once a year and only produce one chick for every breeding attempt.



In 2022, we monitored 3 active White-headed Vulture nests inside the MMNR. Of these 3 nests, 2 successfully fledged a chick and 1 nest failed.

One nest was in open woodland, one in the open plains and one in riverine woodland. All nests were in different tree species: *Balanites aegyptiaca*, *Olea africana*, and *Warburgia ugandensis*. The average nest height was 10.8 meters.



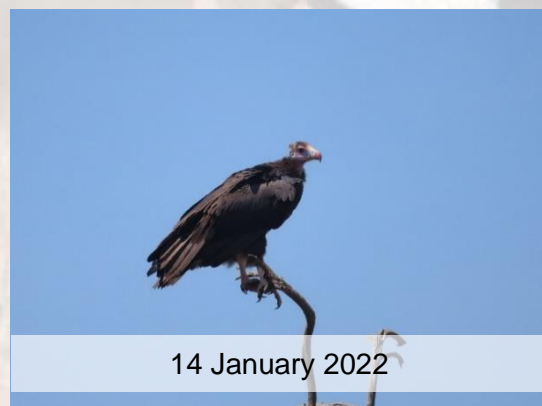
8 September 2021



19 October 2021



17 December 2021

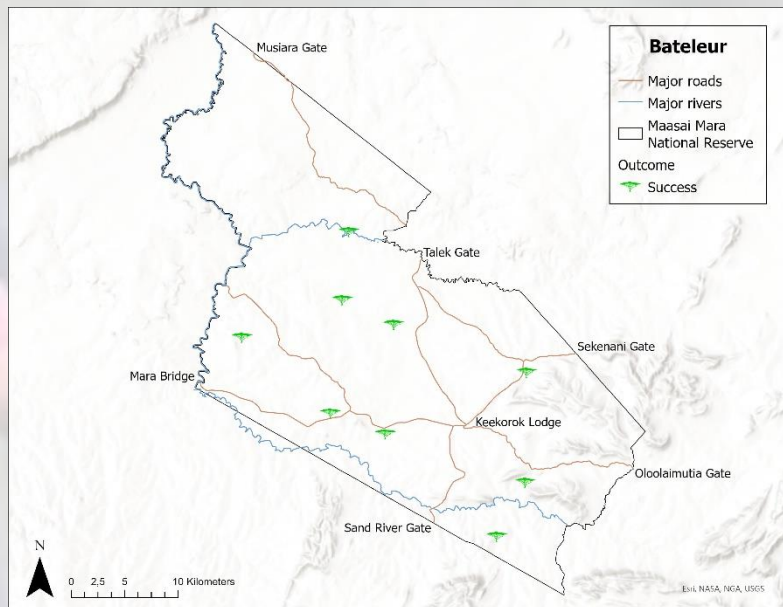


14 January 2022

Bateleur  
*Terathopius ecaudatus*

IUCN Status: **Endangered**

Arguably the most distinctive and beautiful African raptor. They have a continuous and distinctive flight style at low altitudes that makes them easily observed. This gives a false sense of abundance when in reality they are an uncommon and extremely sensitive species. They breed on average once a year and only produce one chick for every breeding attempt.



In 2022, we monitored 9 active Bateleur nests inside the MMNR. All the nests successfully fledged chicks.

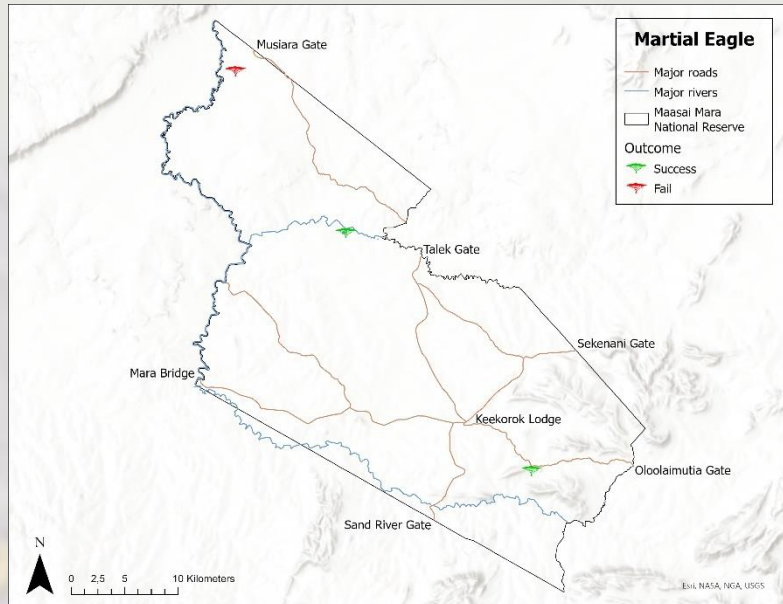
All the nest trees were in riverine woodland. Six of the nests were in *Diospyros abyssinica*, one in *Afrocarpus falcatus*, one in an *Albizia* species, and one in an unknown nest tree species. The average nest height was 10.6 meters.



Martial Eagle  
*Polemaetus bellicosus*

IUCN Status: **Endangered**

The top avian predator in Africa's savannah ecosystem. They are a long-lived territorial species with a broad prey base that includes everything from francolin to lion cubs. They are one of the slowest breeding raptors and on average produce one chick every two years. They build large nests in big trees, but that doesn't always mean their nests are conspicuous.



In 2022, we monitored 3 active Martial Eagles nests inside the MMNR. Two of these nests were successful and fledged chicks. One nest failed to fledge a chick.

All the nests were in riverine woodland, one in an *Warburgia ugandensis*, one in a *Diospyros abyssinica*, and one in a *Ficus* species. With an average nest height of 15.4 meters the Martial Eagle has the highest average nest height of the species that we monitored.

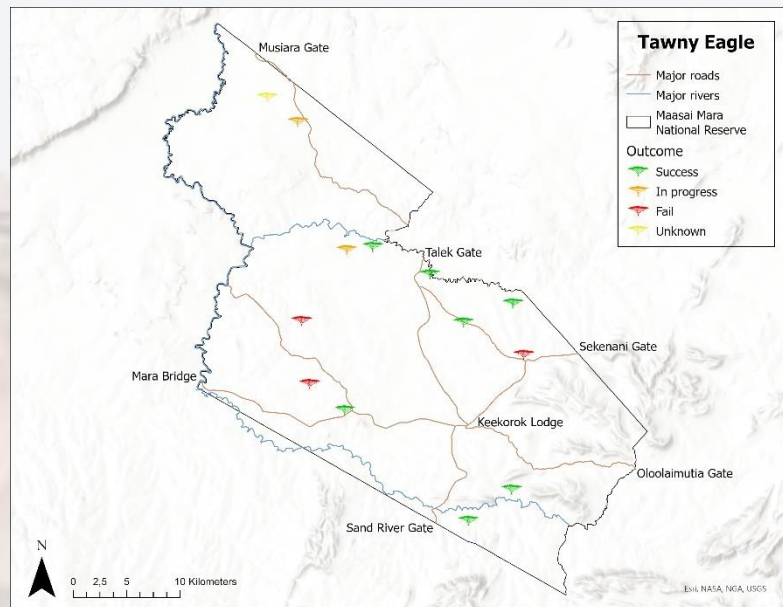


## Tawny Eagle

*Aquila rapax*

IUCN Status: **Vulnerable**

The pirates of the savannah. This species is always on the lookout for a meal. They are masters at stealing kills but are also formidable predators that are more than capable of fending for themselves. Due to their scavenging nature, they are highly susceptible to poisoning. They breed on average once a year and exceptionally can produce two chicks per breeding attempt when conditions are good.



In 2022, we monitored 13 active Tawny Eagle nests inside the MMNR. Of these 13 nests, 7 were successful and fledged one chick each. There were 3 nests that failed to fledge a chick, 1 nest with an unknown outcome, and 2 nests were still in progress at the end of 2022.

Most of these nests were in open woodland (6 nests) and the most used tree species was *Olea africana* (5 nests). The average nest height was 9.9 meters.



28 April 2022



30 May 2022



12 July 2022



23 August 2022

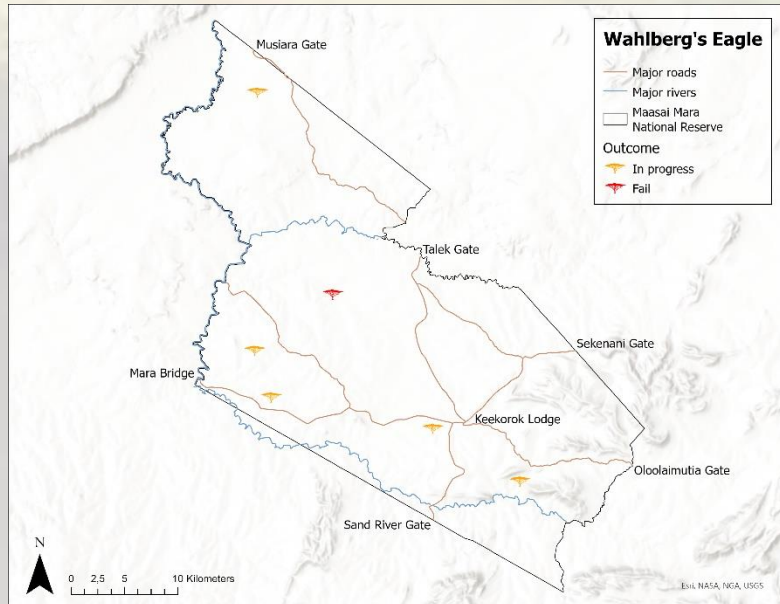


23 September 2022

Wahlberg's Eagle  
*Hieraaetus wahlbergi*

IUCN Status: Least Concern

An intra-African migrant that breeds in the Maasai Mara, but winters in the Sahel. They are the smallest of our focal species and prey mostly on small rodents, reptiles, and birds. Their breeding season runs from August through to January. They breed on average once a year and only produce one chick for every breeding attempt.



In 2022, we monitored 6 active Wahlberg's Eagle nests inside the MMNR. Most of these active nests were still in progress at the end of 2022 (5 nests) and one failed to fledge a chick. We did not record any successful nests in 2022.

Most Wahlberg's Eagle nests were in riverine woodland (5 nests) and one in open woodland. The only tree species used was *Diospyros abyssinica* (6 nests). The average nest height was 7.0 meters.





## Focal species 2021-2022

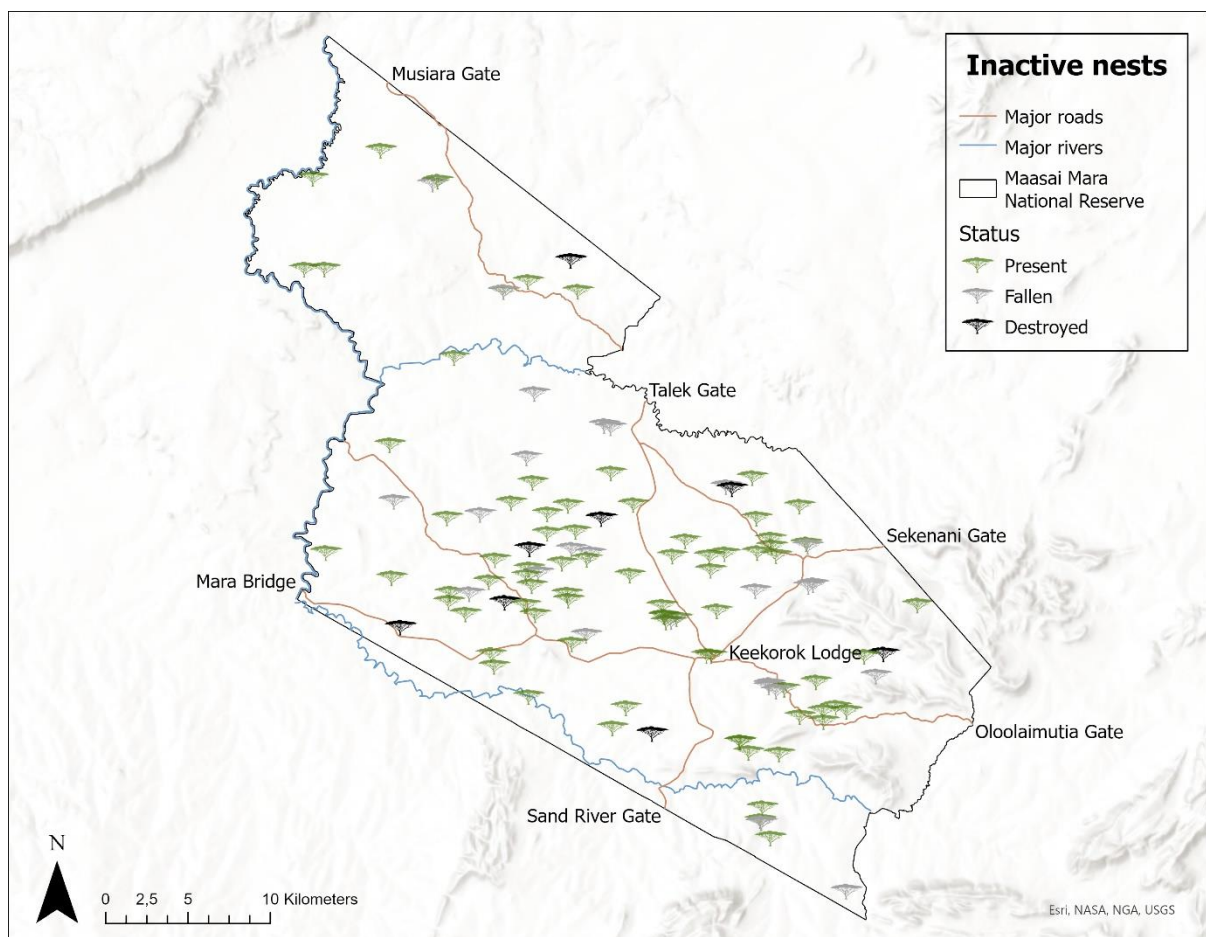
Unfortunately, it is not possible to directly compare data from 2021 to 2022 due to an increase in our knowledge and effort between years. In 2023, we aim to improve our method to account for these differences so that comparisons of nest monitoring data between years better reflects real trends in breeding productivity and population.

	Number of active nests		Number of successful nests		Success rate	
	2021	2022	2021	2022	2021	2022
<b>Secretarybird</b>	13	1	5	0	42%*	NA*
<b>Lappet-faced Vulture</b>	33	38	22	16	67%	47%*
<b>White-backed Vulture</b>	40	74	16	26	70%*	48%*
<b>White-headed Vulture</b>	3	3	3	2	100%	67%
<b>Bateleur</b>	7	9	5	9	83%*	100%
<b>Martial Eagle</b>	2	3	2	2	100%	67%
<b>Tawny Eagle</b>	17	13	7	7	50%*	70%*
<b>Wahlberg's Eagle</b>	6	7	4	0	67%	0%*

\*Success rate is only based on successful and failed nests and exclusive of nests that are still in progress or had an unknown outcome.

## Inactive nests

In total there were 113 nests that were not active in 2022. Of these nests, 26 fell during the year, and 8 were destroyed beyond repair during the year.



## Non-focal species

In addition to our focal species, we also monitored the following raptor species' nests. These nests were opportunistically found while searching for our focal species or were using a nest previously used by one of our focal species.



**Black-chested Snake-eagle**

**1 nest**  
*0 success*  
*0 failure*  
*0 unknown*  
*1 in progress*



**Hooded Vulture**

**1 nest**  
*0 success*  
*0 failure*  
*0 unknown*  
*1 in progress*



**African Fish Eagle**

**1 nest**  
*0 success*  
*0 failure*  
*0 unknown*  
*1 in progress*

## Looking towards the future

In 2023, we aim to grow our nest monitoring efforts to incorporate The Mara Triangle and Oloisukut Conservancy (Block 2) and Pardamat CCA and Naboisho Conservancy (Block 4). Our goal is to have 5 nest monitoring teams monitoring all 5 blocks in the greater Mara ecosystem by 2025. In 2023, we also hope to improve our nest monitoring method by accounting for our “effort” whilst nest monitoring. This change will give us the opportunity to compare data directly between breeding seasons. We are also working to integrate our nest monitoring database with the Earth Ranger platform to make these data more available to our partners and we are working with the One Mara Research Hub to possibly include raptor breeding productivity in the ecosystem monitoring framework as one of the key indicators of the greater Mara region’s health.



A pair of Secretarybirds nest building in the Maasai Mara National Reserve.

## How can you help?

**Report a nest:** Our email is [mrp@kenyabirdofpreytrust.org](mailto:mrp@kenyabirdofpreytrust.org). We are interested in all information on nests in the greater Mara region especially rare species like White-headed Vultures and Martial Eagles.

**Donate:** To achieve our mission, we need all the help we can get. Donations to our project can be made:

1. Directly to our bank account. Please email “[admin@kenyabirdofpreytrust.org](mailto:admin@kenyabirdofpreytrust.org)” for details.
2. Through MPESA (Paybill#: 4041103, Account#: MRP).
3. Via our 501c3 partner in the USA - Empowers Africa.  
[www.empowersafrica.org/partners/kenya-bird-of-prey-trust/](http://www.empowersafrica.org/partners/kenya-bird-of-prey-trust/)
4. Via our ANBI partner in the Netherlands – The Bird of Prey Trust.  
<https://www.birdofpreytrust.org/>
5. Via Paypal.  
[https://www.paypal.com/donate/?hosted\\_button\\_id=YRM9D5MQ4JPCU](https://www.paypal.com/donate/?hosted_button_id=YRM9D5MQ4JPCU)
6. Through our “Adopt a Raptor” programme.  
<https://www.kenyabirdofpreytrust.org/adopt-a-raptor>

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Newsletter subscription: <https://www.kenyabirdofpreytrust.org/newsletter>



## Acknowledgments

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- The Angama Foundation, CARU Containers, The BAND Foundation, Wageningen University and Research, The University of Kentucky, Wilderness Safaris and the Governor’s Camp Collection, Conservancy Guardians and Serian Camps, Sun Africa Hotels, George Powell, Cottar’s Wildlife & Community Trust (CWCT), and several private donors.
- Mara Conservancy, Mara Naboisho Conservancy, Mara North Conservancy, Olare Motorogi Conservancy, Ol Kinyei Conservancy, Lemek Conservancy, Enonkishu Conservancy, Olderkesi Conservancy, Siana Conservancy, Oloisukut Conservancy, and the Maasai Mara Wildlife Conservancies Association (MMWCA).
- Shiv Kapila and Marten Miske for the use of their images in this document.

